FACT SHEET

Risk-Screening Environmental Indicators

The Office of Pollution Prevention and Toxics (OPPT) has developed the Risk-Screening Environmental Indicators (RSEI) to estimate the risk-related impacts of toxic chemical releases in the U.S. RSEI has been developed as a Microsoft Windows-based computer application: a 16-bit version (usable with Windows 3.1 or later operating systems) has been publicly released and is available by calling the TSCA Assistance Information Service at (202) 554-1404; a 32-bit version is under development. The URL for the Indicators' Home Page is: www.epa.gov/opptintr/env_ind/index.html.

Four indicators are eventually planned: chronic & acute human health impacts and chronic & acute ecological impacts. At present, only the Chronic Human Health Indicator has been completed; the acute human health indicator and chronic ecological indicator are currently under development. The Chronic Human Health Indicator model (the "Indicator") provides a risk-related measure of the potential relative impacts of chemical releases on chronic human health. The Indicator uses information from existing EPA models and databases to generate unitless, numeric values to assess the risk-related impacts of chemical releases on chronic human health. Currently, Toxics Release Inventory (TRI) reporting under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) is the primary source of chemical release information. The Indicator integrates estimated toxicity scores for individual chemicals and chemical categories with a measure of exposure potential based upon reported multi-media release and transfer data and the size of the potentially exposed general, non-worker population. The result is *not* a detailed or quantitative risk assessment, *but offers a screening-level, risk-related perspective for relative comparisons of chemical releases*. Since only the air release exposure pathway has been fully groundtruthed, the public version of the Indicator model provides full risk-related values only for on-site fugitive and stack air releases (other release and transfer pathways can be examined from either a pounds-based or a hazard-based perspective).

Chemical release data and appropriate exposure models (addressing fate and transport for each exposure pathway) are used to calculate "Indicator Elements" for each combination of facility, chemical, and medium reported under TRI. Each Indicator Element reflects a surrogate dose weighted by toxicity and the exposed population. Approximately 1.9 million Indicator Elements, representing all combinations of facility-chemical-medium, are generated and stored for ten years of TRI reporting data (1988 to 1997). An "Indicator Value" is the unique sum of many individual Indicator Elements. By comparing each year's Indicator Value to the base year of 1988, or to another previous year, one can obtain a risk-related perspective of trends in environmental well-being as a function of chronic human health. Of the 576 discrete chemicals and 28 separate chemical categories that are subject to 1997 TRI reporting (from 21,490 facilities), 404 chemicals and chemical categories have toxicity weights. Many of the remaining 200 chemicals and chemical categories have no reported releases, have zero pounds of releases reported, or have very low quantities of reported releases. In 1997, 98.2% of all reported TRI releases and transfers had associated toxicity weights.

The flexibility of the Indicator model provides the analyst with the opportunity to not only examine trends, but also to rank and prioritize chemicals for strategic planning, risk-related targeting, and community-based environmental protection. Indicator Elements can be combined in a variety of ways to provide additional analytical capabilities. For example, individual Indicator Elements can be viewed by

medium, chemical, geographic area (national, EPA Region, state, county, city, zip code), industry sector (2-, 3- or 4-digit SIC code), facility or a combination of these and other variables. Because some modeling parameters utilize average values as defaults, the more aggregated the level of a query (e.g., national-level vs. facility-level analyses), the greater the statistical confidence in the model results. Model results are exportable in a dBase or Excel format allowing further analysis in other software applications or incorporation into reports.

The model produces six alternative outputs: reported pounds of TRI releases; TRI reported pounds weighted by toxicity (hazard-based perspective); modeled pounds (representing those chemical releases for which toxicity and exposure-relevant information, e.g., physicochemical data, location, etc., is sufficient to estimate risk-related impacts); modeled pounds weighted by toxicity; modeled pounds weighted by toxicity and population; and the full model (risk-related results) which includes exposure, toxicity and population components. These outputs permit the user to obtain a better understanding of the relative influence that each of these three components of the model may have on the overall estimation of risk-related impacts.

On July 2, 1997, the EPA Science Advisory Board (SAB) conducted a formal review of the Indicator methodology and provided a consultation on the development of the chronic ecological indicator. The final SAB report was published on April 30, 1998. EPA has also solicited comment from a diverse audience of users. Many suggested modifications have already been made to the Indicator model. OPPT is engaged in ongoing improvement and validation of the Indicator model. Please refer to the Indicator Home Page for updates regarding the project, methodology, and guidance.

In the 32-bit version, OPPT will modify the Indicator model to perform risk-related disparate impact analyses by socioeconomic characteristics (such as race, income, educational level, or age) of the population. The Indicator model will calculate the aggregate impacts associated with TRI and non-TRI chemicals from diverse emission sources that affect selected geographic locations. Indicator results can be stored and analyzed using the RSEI tool or exported to other geographic information systems (GIS) such as ArcView.

It is important that the public not confuse the use of the Indicator in examining relative comparisons between TRI chemicals from a risk-related perspective with the very different and separate activity of listing/delisting chemicals on the TRI using statutory criteria. The Indicator methodology begins with the premise that *all* TRI chemicals are of concern. At the present time, Indicator results do not address the acute effects or environmental effects of TRI chemicals. *The toxicity weightings provided in the Indicator method cannot be used as a scoring system for evaluating listing/delisting decisions or for any other aspect of the statutory TRI reporting requirements.*

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